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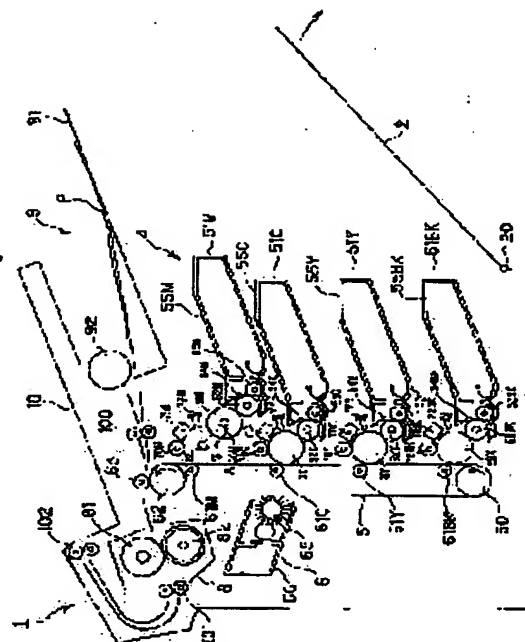
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(54) COLOR IMAGE FORMING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide such a color image forming device that an installment area is made reducible, and color slippage does not occur.

SOLUTION: In this image forming device, an intermediate transfer body 5 is vertically arranged in the upward direction, then photosensitive drum 3M, 3C, 3Y and 3Bk, and processing cartridge respectively consisting of developing device 51M, 51C, 51Y and 51Bk, are disposed along the moving surface thereof. The side face opening/closing cover 2 to be freely opened/closed is disposed on the side surface part opposite to the surface of the intermediate transfer body 5, and the processing cartridge is disposed freely attachably/detachably from the direction of this side face cover 2.



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CLAIMS

[Claim(s)]

[Claim 1] The middle imprint object of the shape of a belt established so that a front face might move along the direction of an abbreviation vertical, Two or more electrostatic latent-image support installed in the direction of an abbreviation vertical along the migration direction of said front face, Two or more electrification means by which each front face of two or more of said electrostatic latent-image support is charged, Two or more exposure means to expose the charged field of each front face of two or more of said electrostatic latent-image support, It has two or more development means containing two or more developer support arranged so that each of two or more of said electrostatic latent-image support might be countered. At least said development means Color picture formation equipment characterized by what is arranged free [attachment and detachment] by the body of equipment from the lateral portion of the side which counters said front face of the middle imprint object of the shape of said belt as a process cartridge.

[Claim 2] Color picture formation equipment according to claim 1 characterized by having the LED array prepared in the shaft orientations of said electrostatic latent-image support by extending as said two or more exposure means fixed to the body of equipment.

[Claim 3] Said process cartridge contains said development means and said electrostatic latent-image support at least. Each of two or more of said LED arrays It is based on a field perpendicular to the front face of said middle imprint object including the shaft of said electrostatic latent-image support at the time of wearing of said process cartridge. Color picture formation equipment according to claim 2 characterized by being arranged so that it may counter to each front face of two or more of said electrostatic latent-image support from an opposite direction with the balking direction over said middle imprint object of said electrostatic latent-image support.

[Claim 4] Claim 1 characterized by collecting that said two or more developer support should boil the developer which remained on each electrostatic latent-image support through electrification and exposure, respectively with migration of each electrostatic latent-image support after imprinting the developer image formed in each of two or more of said electrostatic latent-image support on said middle imprint object thru/or color picture formation equipment of any 1 publication of 3.

[Claim 5] For said two or more electrification means, said process cartridge is claim 1 characterized by being prepared in the body side of equipment and dissociating with said electrostatic latent-image support at the time of exchange of said process cartridge thru/or color picture formation equipment of any 1 publication of 4 including said development means and said electrostatic latent-image support at least.

[Claim 6] It has further the transfer-medium supply tray which supplies a transfer medium, and the transfer-medium discharge tray which lays the transfer medium discharged after image formation process termination. In the path of insertion of said transfer-medium supply tray and said process cartridge, and a list, the eject direction of the transfer medium to said transfer-medium discharge tray Claim 1 characterized by being the direction which counters this front face of the middle imprint object of the shape of a belt established so that a front face might move along the direction of an abbreviation vertical thru/or color picture formation equipment of any 1 publication of 5.

[Claim 7] It is color picture formation equipment according to claim 6 which is further equipped with the control panel containing various kinds of manual operation buttons etc., and is characterized by attaching this control panel in the sense which makes the actuation direction the direction which counters this front face of the middle imprint object of the shape of a belt established so that a front face might move along the direction of an abbreviation vertical.

[Claim 8] Color picture formation equipment given in claim 1 characterized by equipping the exterior of said process cartridge with a cleaning means to collect the transfer residue developers on said two or more

electrostatic latent-image support, and having a conveyance means to convey the waste developer collected for this cleaning means to the shaft orientations of said electrostatic latent-image support thru/or any 1 term of 7.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention installs two or more electrostatic latent-image support developed by the developer of each color along the migration direction of a middle imprint object, and belongs to the technical field of the color picture formation equipment which forms a color picture.

[0002]

[Description of the Prior Art] Conventionally, as color picture formation equipment, cyanogen, a Magenta, yellow, and the toner of black are held in a development counter different, respectively, and there is the so-called color picture formation equipment of the direction of a vertical or the tandem system which installs horizontally and changes about the electrostatic latent-image support developed by these development counters and these development counters.

[0003] In the color picture formation equipment of this tandem system, since each development counter which held the toner of each color can perform development actuation to abbreviation coincidence, it can form a color picture in a high speed extremely.

[0004]

[Problem(s) to be Solved by the Invention] However, since the color picture formation equipment of the conventional tandem system had taken the gestalt which installs two or more process units which consist of a photoconductor drum and a developer in abbreviation parallel side by side to the installation side of color picture formation equipment, it had the problem that installation area became large.

[0005] Then, the equipment which decreased installation area is indicated by JP,08-190245,A etc. by installing said two or more process units in the direction of a vertical.

[0006] However, since it was [that the configuration of each development counter is complicated in the paper output tray sticking out of the side face of equipment by the method indicated by said official report etc., and] large-sized, it was difficult to miniaturize the whole color picture formation equipment.

[0007] Furthermore, by enabling closing motion of the side plate of a direction perpendicular to the shaft orientations of a photoconductor drum, and opening the side plate concerned, it consisted of conventional equipment so that said process unit might be exchanged.

[0008] There was a means to position the revolving shaft of a photoconductor drum, or a means to position the revolving shaft of the driving roller of a middle imprint belt in the interior of the equipment seen from said side plate side, these means became obstructive and there was a problem that exchange of said process unit was difficult.

[0009] Consequently, there was a problem from which a proper location may not be equipped with a new process unit, and the image of a certain color shifts to the image of other colors that the so-called color gap occurred.

[0010] Then, this invention makes it the technical problem to offer the color picture formation equipment which is not made to generate a color gap while [both] it solves such a trouble and can miniaturize installation area.

[0011]

[Means for Solving the Problem] In order that color picture formation equipment according to claim 1 may solve said technical problem The middle imprint object of the shape of a belt established so that a front face might move along the direction of an abbreviation vertical, Two or more electrostatic latent-image support installed in the direction of an abbreviation vertical along the migration direction of said front face, Two or more electrification means by which each front face of two or more of said electrostatic latent-image support is charged, Two or more exposure means to expose the charged field of each front face of two or more of

said electrostatic latent-image support, It has two or more development means containing two or more developer support arranged so that each of two or more of said electrostatic latent-image support might be countered. At least said development means It is characterized by being arranged free [attachment and detachment] by the body of equipment from the lateral portion of the side which counters said front face of the middle imprint object of the shape of said belt as a process cartridge.

[0012] According to color picture formation equipment according to claim 1, each of two or more electrostatic latent-image support is installed in the direction of an abbreviation vertical along the migration direction of said front face of the middle imprint object of the shape of said belt, and said two or more electrification means, two or more exposure means, and two or more development means are arranged so that each electrostatic latent-image support may be countered. Therefore, since what is necessary is not to secure the arrangement field of said middle imprint object, electrostatic latent-image support, an electrification means, an exposure means, and a development means in the parallel direction, and just to secure in it in the perpendicular direction to said installation side to the installation side of the body of color picture formation equipment, reduction-ization of the area of said installation side is attained.

[0013] Moreover, since exchange of said process cartridge is performed from the lateral portion of the side which counters said front face of the middle imprint object of the shape of said belt, the attachment component prepared in the shaft-orientations both ends of said middle imprint object or the positioning means formed in the shaft-orientations both ends of said electrostatic latent-image support does not become obstructive at said *****. Consequently, a proper location will be certainly equipped with said process cartridge, and it reduces the so-called generating of a color gap certainly.

[0014] Color picture formation equipment according to claim 2 is characterized by having an LED array fixed to the body of equipment as said two or more exposure means in color picture formation equipment according to claim 1, in order to solve said technical problem.

[0015] Although it is necessary to support the LED array concerned at the both ends of the shaft orientations in order to have the LED array prepared in the shaft orientations of said electrostatic latent-image support by extending fixed to color picture formation equipment according to color picture formation equipment according to claim 2 As mentioned above, since exchange of said process cartridge is performed from the lateral portion of the side which counters said front face of the middle imprint object of the shape of said belt, the supporter of said LED array does not become obstructive at said *****. Consequently, a location gap of said LED array is prevented certainly, and the so-called generating of a color gap is reduced certainly.

[0016] Color picture formation equipment according to claim 3 is set to color picture formation equipment according to claim 2, in order to solve said technical problem. Said process cartridge Said development means and said electrostatic latent-image support are included at least. Each of two or more of said LED arrays It is based on a field perpendicular to the front face of said middle imprint object including the shaft of said electrostatic latent-image support at the time of wearing of said process cartridge. With the balking direction over said middle imprint object of said electrostatic latent-image support, it is characterized by being arranged from the opposite direction, so that it may counter to each front face of two or more of said electrostatic latent-image support.

[0017] According to color picture formation equipment according to claim 3, said development means and said electrostatic latent-image support are contained in said process cartridge at least, but Each of two or more of said LED arrays is based on a field perpendicular to the front face of said middle imprint object including the shaft of said electrostatic latent-image support at the time of wearing of said process cartridge. Since it has countered from the opposite direction to each front face of two or more of said electrostatic latent-image support with the balking direction over said middle imprint object of said electrostatic latent-image support Even when an LED array with the need of making said electrostatic latent-image support approaching, and arranging is used, the LED array concerned does not become obstructive in the case of balking of said process cartridge. Consequently, while a proper location is certainly equipped with said process cartridge, a location gap of said LED array is prevented certainly, and reduces the so-called generating of a color gap certainly.

[0018] In order that color picture formation equipment according to claim 4 may solve said technical problem In claim 1 thru/or the color picture formation equipment of any 1 publication of 3 After imprinting the developer image formed in each of two or more of said electrostatic latent-image support on said middle imprint object, it is characterized by collecting that said two or more developer support should boil the developer which remained on each electrostatic latent-image support through electrification and exposure, respectively with migration of each electrostatic latent-image support.

[0019] According to color picture formation equipment according to claim 4, since it is collected said two or more developer support be alike through electrification and exposure, respectively with migration of each electrostatic latent-image support, the transfer residue developer on each electrostatic latent-image support becomes unnecessary [the waste developer container for accumulating said transfer residue developer]. Therefore, at the time of exchange of said process cartridge, a waste developer container does not serve as hindrance, but the so-called generating of a color gap is reduced certainly.

[0020] In order that color picture formation equipment according to claim 5 may solve said technical problem, in claim 1 thru/or the color picture formation equipment of any 1 publication of 4, at least, including said development means and said electrostatic latent-image support, said two or more electrification means are formed in the body side of equipment, and said process cartridge is characterized by dissociating with said electrostatic latent-image support at the time of exchange of said process cartridge.

[0021] According to color picture formation equipment according to claim 5, since it dissociates with electrostatic latent-image ***** at the time of exchange of said process cartridge, said electrification means is performed easily, without exchange of the process cartridge containing the electrostatic latent-image ***** concerned being barred by said electrification means. Therefore, the so-called generating of the color gap at the time of exchange of said process cartridge is prevented certainly.

[0022] In order that color picture formation equipment according to claim 6 may solve said technical problem In claim 1 thru/or the color picture formation equipment of any 1 publication of 5 It has further the transfer-medium supply tray which supplies a transfer medium, and the transfer-medium discharge tray which lays the transfer medium discharged after image formation process termination. It is characterized by being the path of insertion of said transfer-medium supply tray and said process cartridge, and the direction which counters this front face of the belt-like middle imprint object with which the eject direction of the transfer medium to said transfer-medium discharge tray was established in the list so that a front face might move along the direction of an abbreviation vertical.

[0023] According to color picture formation equipment according to claim 6, the path of insertion of said transfer-medium supply tray, and the eject direction of the transfer medium to said transfer-medium discharge tray Since it is the direction which counters this front face of the middle imprint object of the shape of a belt which is the path of insertion and this direction of said process cartridge, and was established so that a front face might move along the direction of an abbreviation vertical The workability of the ejection of said transfer medium by which said transfer-medium supply tray was detached, attached and discharged improves without barring the miniaturization of equipment.

[0024] In order that color picture formation equipment according to claim 7 may solve said technical problem, in color picture formation equipment according to claim 6, it has further a control panel containing various kinds of manual operation buttons etc., and this control panel is characterize by be attach in the sense which makes the actuation direction the direction which counters this front face of the middle imprint object of the shape of a belt established so that a front face might move along the direction of an abbreviation vertical.

[0025] According to color picture formation equipment according to claim 7, the actuation direction of a control panel also raises operability further, without barring the miniaturization of equipment in the path-of-insertion list of said process cartridge and said transfer-medium supply tray, since it is the eject direction and this direction of a transfer medium of said transfer-medium discharge tray. Moreover, if the height of the body of image formation equipment becomes high and a control panel is prepared in a top face by having installed two or more electrostatic latent-image support in the direction of an abbreviation vertical, it will be hard coming to operate it, but in this invention, in order to prepare in a side face, such a problem does not occur.

[0026] Color picture formation equipment according to claim 8 is characterized by equipping the exterior of said process cartridge with a cleaning means to collect the transfer residue developers on said two or more electrostatic latent-image support, and equipping this cleaning means with a conveyance means to convey the collected waste developer to the migration shaft orientations of said electrostatic latent-image support, in color picture formation equipment given in claim 1 thru/or any 1 term of 7, in order to solve said technical problem.

[0027] According to color picture formation equipment according to claim 8, since a cleaning means is not included in said process cartridge, said cleaning means does not become obstructive at the time of exchange of said process cartridge. Therefore, the so-called generating of the color gap which can set at the time of exchange of said process cartridge, and is required is prevented certainly. Moreover, even when it is

possible to make it fall caudad by gravity after conveying, since it is conveyed by the migration shaft orientations of said electrostatic latent-image support with a conveyance means as for the collected waste developer and a cleaning means is not included in said process cartridge, processing of a waste developer will be performed exactly.

[0028]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained based on an accompanying drawing.

(1st operation gestalt)

[0029] First, the 1st operation gestalt of this invention is explained based on drawing 1. Drawing 1 is the outline sectional side elevation of the color laser beam printer as color picture formation equipment with which this invention was applied.

[0030] The color picture formation equipment 1 illustrated to drawing 1 is equipped with the visible image formation section 4, the belt-like middle imprint object 5, the fixing unit 8, the feed unit 9, and the paper output tray 10.

[0031] The visible image formation section 4 for every visible image process by the Magenta (M), cyanogen (C), yellow (Y), and each toner of black (Bk) Development counters 51M, 51C, and 51Y and 51Bk, It has photoconductor drums 3M, 3C, and 3Y, 3Bk, cleaning rollers 70M, 70C, and 70Y, 70Bk, the electrification machines 71M, 51C, and 51Y, 51Bk and LED arrays 72M, 72C, and 72Y, and 72Bk. Hereafter, each of these components are explained in detail.

[0032] First, development counters 51M, 51C, and 51Y and 51Bk are equipped with the developing rollers 52M, 52C, and 52Y as developer support, and 52Bk. Developing rollers 52M, 52C, and 52Y and 52Bk are constituted in the shape of a cylinder considering conductive silicone rubber as a base material, and the coat layer of the resin containing a fluorine or rubber material is further formed in the front face. In addition, developing rollers 52M, 52C, and 52Y and 52Bk do not necessarily need to constitute a base material from conductive silicone rubber, and may constitute it from conductive polyurethane rubber. And the surface ten-point average of roughness height (Rz) is set as 3-5 micrometers, and it is constituted so that it may become smaller than 9 micrometers which is the mean particle diameter of a toner. Moreover, the predetermined electrical potential difference is impressed to developing rollers 52M, 52C, and 52Y and 52Bk, and it is constituted so that it may have the predetermined potential difference between photoconductor drums 3M, 3C, and 3Y and 3Bk.

[0033] Each development counters 51M, 51C, and 51Y and 51Bk are equipped with feed rollers 53M, 53C, and 53Y and 53Bk. Feed rollers 53M, 53C, and 53Y and 53Bk are conductive sponge rollers, and they are arranged so that press contact may be carried out according to the elastic force of sponge to developing rollers 52M, 52C, and 52Y and 52Bk. In addition, if referred to as feed rollers 53M, 53C, and 53Y and 53Bk, proper members, such as conductive silicone rubber or polyurethane rubber, can be used.

[0034] Each development counter is further equipped with the thickness regulation blades 54M, 54C, and 54Y and 54Bk. The thickness regulation blade blades 54M, 54C, and 54Y and 54Bk Supporter 54aM, 54aC, 54aY, and 54aBk by which it was formed with stainless steel etc. and the end face was fixed to the development counter cases 55M, 55C, and 55Y and 55Bk, It was prepared at the tip of the supporter 54aM, 54aC, 54aY, and 54aBk, and has contact section 54bM formed by silicone rubber, conductive conductive fluorine content rubber, or conductive resin, 54bC, 54bY, and 54bBk. The pressure welding of contact section 54bM, 54bC, 54bY, and the 54bBk is carried out to developing rollers 52M, 52C, and 52Y and 52Bk by the elastic force of supporter 54aM, 54aC, 54aY, and 54aBk. As shown in drawing 1, the configuration of contact section 54bM, 54bC, 54bY, and 54bBk is formed so that a cross section may serve as an abbreviation half moon-like convex configuration. Moreover, in this operation gestalt, developing rollers 52M, 52C, and 52Y and 52Bk are interlocked with also to the thickness regulation blades 54M, 54C, and 54Y and 54Bk, and the predetermined electrical potential difference is impressed.

[0035] moreover, the development counter cases 55M, 55C, and 55Y and the toner contained by 55Bk -- a positive triboelectric charging nonmagnetic 1 component developer -- it is -- a suspension polymerization -- **** -- it has the toner mother particle with a mean particle diameter of 9 micrometers which comes to add electric charge control agents, such as well-known coloring agents, such as carbon black, and Nigrosine, a triphenylmethane color, and quarternary ammonium salt, or electric charge control resin to the styrene-acrylic resin formed spherically. And said toner T adds a silica as an external additive on the front face of the toner mother particle, and is constituted. Moreover, hydrophobing processing of common knowledge by the silane coupling agent, silicone oil, etc. is performed to the silica as said external additive, mean particle diameter is 10nm, and the addition is 0.6% of the weight of a toner mother particle. The toner of a Magenta,

cyanogen, yellow, and black is held, respectively every development counter case 55M, 55C, and 55Y and 55Bk.

[0036] Thus, a toner is a near suspension-polymerization toner very spherically, and since it has moreover added the silica whose mean particle diameter is 10nm and which carried out hydrophobic processing as an external additive 0.6% of the weight, it is extremely excellent in the fluidity. Therefore, sufficient amount of electrifications is obtained by frictional electrification. Furthermore, since a corner does not exist like a grinding toner, it is hard to receive the mechanical force, and excels in the flattery nature to electric field, and imprint effectiveness is good.
 [0037] That by which the positive triboelectric charging sensitization layer was formed on the base material made from aluminum is used for the photoconductor drums 3M, 3C, and 3Y as electrostatic latent-image support, and 3Bk as an example. The thickness of a sensitization layer is formed in 18 micrometers or more, and the base material made from said aluminum is used as a ground layer. Furthermore, the rotation drive of photoconductor drums 3M, 3C, and 3Y and the 3Bk is carried out in the direction of an arrow head shown in drawing 1.

[0038] The cleaning rollers 70M, 70C, and 70Y as a cleaning means and 70Bk are rollers which consist of conductive elastic bodies, such as sponge, and they are constituted so that rubbing may be carried out to photoconductor drums 3M, 3C, and 3Y and 3Bk. It is constituted by the power source which is not illustrated at these cleaning rollers 70M, 70C, and 70Y and 70Bk so that the electrical potential difference of the negative polarity of the reversed polarity of a toner may be impressed, and it is constituted by the operation of the electric field by photoconductor drums 3M, 3C, and 3Y, the rubbing power to 3Bk, and said electrical potential difference so that a residual toner may be removed from photoconductor drums 3M, 3C, and 3Y and 3Bk. In addition, since the so-called cleaner loess development method is adopted, in the predetermined cycle after a development process is completed, once returning again cleaning rollers 70M, 70C, and 70Y and the residual toner removed by 70Bk to the photoconductor drum 3M,C [3], and 3Y and 3Bk side also consists of these operation; gestalten possible.

[0039] The electrification machines 71M, 71C, and 71Y as an electrification means and 71Bk are the electrification machines of a scorotron mold, and are countered and arranged in said photoconductor drums 3M, 3C, and 3Y and the front face of 3Bk in said photoconductor drums 3M, 3C, and 3Y and the hand-of-cut downstream of 3Bk rather than said cleaning rollers 70M, 70C, and 70Y and 70Bk. In addition, you may make it use the electrification machine of photoconductor drums 3M, 3C, and 3Y and the roller mold in contact with 3Bk as the electrification machines 71M, 71C, and 71Y and 71Bk.

[0040] LED arrays 72M, 72C, and 72Y as an exposure means and 72Bk are countered and arranged in said photoconductor drums 3M, 3C, and 3Y and the front face of 3Bk in said photoconductor drums 3M, 3C, and 3Y and the hand-of-cut downstream of 3Bk rather than said electrification machines 71M, 71C, and 71Y and 71Bk. The light according to drawing data is irradiated by the exposure means 72M, 72C, and 72Y and 72Bk on photoconductor drums 3M, 3C, and 3Y and the front face of 3Bk, and the electrostatic latent image for every color is formed of them on photoconductor drums 3M, 3C, and 3Y and the front face of 3Bk.

[0041] By the above configurations, in the contact section of developing rollers 52M, 52C, and 52Y, 52Bk, and photoconductor drums 3M, 3C, and 3Y and 3Bk, the toner just charged to photoconductor drums 3M, 3C, and 3Y and the electrostatic latent image of a plus polarity (forward electrification) formed on 3Bk can be developed good by the reversal development method, and a very high definition image can be formed.

[0042] Moreover, in this operation gestalt, photoconductor drums 3M, 3C, and 3Y, 3Bk, and development counters 51M, 51C, and 51Y and 51Bk are formed as a process cartridge, and as shown in drawing 2, they are prepared free [attachment and detachment] to the body of equipment. On the other hand, cleaning rollers 70M, 70C, and 70Y, 70Bk, the electrification machines 71M, 71C, and 71Y, 71Bk and LED arrays 72M, 72C, and 72Y, and 72Bk are prepared fixed to the body of equipment.

[0043] The belt-like middle imprint object 5 forms conductive sheets, such as a polycarbonate or polyimide, in the shape of a belt. As the belt-like middle imprint object 5 is shown in drawing 1, two driving rollers 60 and 62 are built and the middle imprint rollers 61M, 61C, and 61Y and 61Bk are prepared photoconductor drums 3M, 3C, and 3Y and near the opposite location with 3Bk. The migration direction of the photoconductor drums 3M, 3C, and 3Y of the middle imprint object 5, 3Bk, and the front face of the side which counters is set up in the direction in which it moves to above from the direction of vertical down, as shown in drawing 1.

[0044] The predetermined electrical potential difference is impressed to the middle imprint rollers 61M, 61C, and 61Y and 61Bk, and it is constituted so that photoconductor drums 3M, 3C, and 3Y and the toner image formed on 3Bk may be imprinted on the middle imprint object 5 of the shape of a belt which consists of said conductive sheet. Moreover, the roller 63 is countered and formed in the roller [in / for a toner

image / the location to a form to imprint] 62, and predetermined potential is impressed also to the roller 63. Consequently, the toner image of four colors supported on the belt-like middle imprint object 5 will be imprinted by the form.

[0045] In addition, as shown in drawing 1, the cleaning machine 6 is formed in the photoconductor drum [of the middle imprint object 5] 3M,C [3], and 3Y, opposite-with 3Bk, and opposite side. The cleaning machine 6 consists of a scraping member 65 which consists of a conductive brush, and a case 66, and holds electrically the toner which remained on the middle imprint object 5 in scraping and a case 66 by the scraping member 65.

[0046] The fixing unit 8 consists of a heating roller 82 and a pressurization roller 81, and it fixes said toner image to a form by heating and pressurizing, carrying out **** conveyance of the form which supported the toner image of four colors with a heating roller 82 and the pressurization roller 81.

[0047] The feed unit 9 consists of a hold tray 91 which holds Form P, and a pickup roller 92 which sends out a form. The feed unit 9 is constituted so that LED arrays 72M, 72C, and 72Y, 72Bk, the visible image unit 4, photoconductor drums 3M, 3C, and 3Y, 3Bk and an image formation process with the middle imprint object 5, and predetermined timing may be taken and Form P may be supplied. the form P supplied from the feed unit 9 -- a conveyance roller pair -- it is conveyed by 100 at the pressure-welding section of the middle imprint object 5 and a roller 63.

[0048] the paper output tray 10 is formed in the delivery side of said fixing unit 8, and is discharged from said fixing unit 8 -- having -- a conveyance roller pair -- it is constituted so that the form P conveyed by 101 and 102 may be held.

[0049] Next, actuation of the color picture formation equipment in these above operation gestalten is explained. First, photoconductor drums 3M, 3C, and 3Y and the sensitization layer of 3Bk are uniformly charged by the electrification machines 71M, 71C, and 71Y and 71Bk, next these sensitization layers are exposed by the LED light corresponding to the image of LED arrays 72M, 72C, and 72Y, the Magenta color irradiated by 72Bk, a cyanogen color, a yellow color, and a black color. And by Magenta development counter 51M, cyanogen development counter 51C, and yellow development counter 51Y and black development counter 51Bk, a Magenta toner, a cyanogen toner, a yellow toner, and a black toner are made to adhere to the electrostatic latent image formed on photoconductor drums 3M, 3C, and 3Y and the sensitization layer of 3Bk, respectively, and development of a Magenta color, a cyanogen color, a yellow color, and a black color is carried out to it. Thus, the toner image of the formed Magenta color, a cyanogen color, a yellow color, and a black color is once imprinted on the front face of the middle imprint object 5.

[0050] Next, the photoconductor drums 3M, 3C, and 3Y after an imprint and the toner which remained on 3Bk are removed by cleaning rollers 70M, 70C, and 70Y and 70Bk.

[0051] According to the location of the passing speed of the middle imprint object 5 and each photoconductor drums 3M, 3C, and 3Y, and 3Bk, the toner image of each color is constituted so that it may be formed with some time difference, and it is imprinted so that the toner image of each color may pile up on the middle imprint object 5.

[0052] The toner image of four colors formed on the middle imprint object 5 as mentioned above is imprinted in the pressure-welding location of a roller 63 and the middle imprint object 5 on the form P supplied from the feed unit 9. And in the fixing unit 8, it is fixed to this toner image on Form P, and it is discharged on a paper output tray 10. 4 color color picture will be formed as mentioned above.

[0053] As mentioned above, since the visible image formation section 4 for every color has adopted the so-called tandem system arranged along the migration direction of the middle imprint object 5, the color picture formation equipment of this operation gestalt can form a color picture in a high speed to the same extent as the case of monochromatic image formation.

[0054] In addition, with this operation gestalt, since the belt-like thing is used as a middle imprint object 5, the long field which counters the visible image formation section can be taken, and all the visible image formation sections can be installed in a lengthwise direction side by side as mentioned above. Consequently, compared with a mold, installation area of the body of equipment can be made small every conventional width.

[0055] And in this operation gestalt, as shown in drawing 1, the frame side cover 2 is constituted rotatable in the direction of an arrow head of drawing 1 centering on the shaft 20. Drawing 2 shows the condition of having opened the frame side cover 2 wide. Thus, by constituting, exchange of said development counters 51M, 51C, and 51Y and 51Bk can be performed easily. In addition, although shaft 2c is horizontally parallel, it is also possible as parallel to the direction of a vertical to open a frame side cover to the circumference of the shaft.

[0056] As shown in the laser beam printer 1 of this operation gestalt at drawing 3, Frames 11A and 11B are formed in the both ends of the direction of a revolving shaft of the middle imprint object 5. Frames 11A and 11B are used for the positioning member of the revolving shaft in the driving rollers 60 and 62 of the middle imprint object 5 and photoconductor drums 3M, 3C, and 3Y, the positioning member of the revolving shaft of 3Bk, and the list as LED arrays 72M, 72C, and 72Y and supporter material of 72Bk. In addition, drawing 3 is drawing showing the frames 11A and 11B at the time of removing development counters 51M, 51C, and 51Y and 51Bk, and photoconductor drums 3M, 3C, and 3Y, 3Bk and LED arrays 72M, 72C, and 72Y and physical relationship with 72Bk from the lateral portion side in which the frame side cover 2 was formed, in order to simplify explanation.

[0057] As shown in drawing 2, the tooling holes 12 to revolving-shaft 30M of photoconductor drum 3M and the guide slot 13 which shows revolving-shaft 30M to tooling holes 12 are formed in Frames 11A and 11B. This configuration is the same also about other photoconductor drums 3C and 3Y, the revolving shafts 30C and 30Y of 3Bk, and 30Bk, and as shown in drawing 3, each revolving shafts 30M, 30C, and 30Y and 30Bk are positioned by Frames 11A and 11B.

[0058] Therefore, since exchange of a process cartridge can be performed in this operation gestalt by opening the frame side cover 2 prepared in the lateral portion which countered the front face of the middle imprint object 5 as shown in drawing 2, Frames 11A and 11B do not become the hindrance of exchange. That is, since a process cartridge is easily exchangeable, a certainly proper arrangement location can be equipped with a process cartridge so that revolving-shaft 30M may be attached in tooling holes 12. Consequently, since there is no location gap of each process cartridge, only the image of a specific color can prevent certainly the so-called generating of the color gap which shifts to the image of other colors.

[0059] Moreover, in this operation gestalt, LED arrays 72M, 72C, and 72Y and 72Bk are attached in Frames 11A and 11B as shown in drawing 3, and they are prepared fixed to the body of equipment. And tooling holes 12 are prolonged caudad and LED array 72 is formed above tooling holes 12 for the guide slot 13. That is, photoconductor drums 3M, 3C, and 3Y and 3Bk move downward, when seceding from the middle imprint object 5 (in the balking direction of claim 3). Therefore, as mentioned above, the process cartridge is removable, without interfering with these LED arrays 72M, 72C, and 72Y and the frames 11A and 11B which support 72Bk. Therefore, even if it performs exchange of a process cartridge, the location of LED arrays 72M, 72C, and 72Y and 72Bk does not shift, and generating of a color gap can be certainly prevented also from this point.

[0060] moreover, since the so-called cleaner loess development method is adopted, in the predetermined cycle after a development process is completed, once boiling again cleaning rollers 70M, 70C, and 70Y and the residual toner removed by 70Bk, and returning to the photoconductor drum 3M, C [3], and 3Y and 3Bk side also consists of these operation gestalten possible. Therefore, it is not necessary to prepare a waste toner box with this operation gestalt. In the conventional equipment which has not adopted the cleaner loess development method, the waste toner box needed to be prepared around the photoconductor drum, and when it was exchange of a process cartridge, there was a problem that a photoconductor drum and a waste toner box interfered and exchange became difficult. However, with this operation gestalt, since it is not necessary to prepare a waste toner box, there is such no problem and process cartridges can be exchanged easily. Generating of a color gap can be certainly prevented also from this point.

[0061] Furthermore, in this operation gestalt, the electrification machines 71M, 71C, and 71Y and 71Bk are constituted so that it may dissociate from photoconductor drums 3M, 3C, and 3Y and 3Bk at the time of exchange of a process cartridge, as shown in drawing 2. Therefore, exchange of said process cartridge is not barred by these electrification machines 71M, 71C, and 71Y and 71Bk, either, and it can prevent generating of a color gap certainly also from this point.

[0062] Moreover, in this operation gestalt, as shown in drawing 2, it is constituted so that it may become in the direction where Form P is discharged in a paper output tray 10, and the direction where the path of insertion of a process cartridge is the same. Furthermore, it is constituted so that the path of insertion of a medium tray 9 may also become in the same direction. Therefore, while the miniaturization of equipment is realizable, the good laser beam printer of operability can be offered. Furthermore, as shown in drawing 4, the control panel 15 is formed in the upper right of a side face. Therefore, all of the closing motion direction of the frame side cover 2 in the case of exchange of a process cartridge, the direction of ejection of the discharged form, and the actuation direction of a control panel 15 are the same directions, and a laser beam printer with very sufficient operability can be offered. Furthermore, although the height of the body of image formation equipment becomes high by having installed two or more photoconductor drums 3M, 3C, and 3Y and 3Bk in the direction of an abbreviation vertical, operability is good in order to form a control

panel 15 in a side face.

[0063] (2nd operation gestalt) Next, the 2nd operation gestalt of this invention is explained based on drawing 5 thru/or drawing 7. In addition, the same sign is given to a common part with the 1st operation gestalt, and explanation is omitted.

[0064] As this operation gestalt is shown in drawing 5, the place where the photoconductor drums 3M, 3C, and 3Y of the middle imprint object 5 and the migration direction of the front face which counters 3Bk are going to down from the direction of vertical above differs from the 1st operation gestalt.

[0065] When the middle imprint object 5 is constituted in this way, as shown in drawing 5, the location of the feed unit 9 and the roller 63 for an imprint will be caudad located rather than the middle imprint object 5.

[0066] Furthermore, since each photoconductor drums 3M, 3C, and 3Y and the hand of cut of 3Bk become counter clockwise as shown in drawing 2, According to it, the location of LED arrays 72M, 72C, and 72Y and 72Bk is also caudad set as the cleaning means 73M, 73C, and 73Y, 73Bk and the electrification machines 71M, 71C, and 71Y, 71Bk, and a list to photoconductor drums 3M, 3C, and 3Y and 3Bk.

[0067] Furthermore, the location of the thickness regulation blades 54M, 54C, and 54Y and 54Bk is also caudad set up to developing rollers 52M, 52C, and 52Y and 52Bk.

[0068] Moreover, as shown in drawing 5, a point equipped with the form conveyance pass for double-sided printing other than the usual form conveyance pass as showed this operation gestalt to drawing 1 differs from the 1st operation gestalt. the conveyance roller pair prepared in the delivery unit of the fixing unit 8 in this operation gestalt -- 101 and the conveyance roller pair further prepared in the conveyance direction downstream of Form P -- between 103 the conveyance roller pair which the path switch plate 104 is formed and was prepared in the conveyance direction upstream of Form P rather than the roller 63 as said secondary [conveyance roller pair 103 to] imprint means -- with the form conveyance path 105 for double-sided printing before 108 a conveyance roller pair -- 106 and 107 are prepared.

[0069] In performing double-sided printing in this operation gestalt, it sets it as the location which shows the path switch plate 104 to drawing 5 first. next, the form P discharged from the fixing unit 8 -- a conveyance roller pair -- 103 -- up to the middle -- conveying -- the back end section of Form P -- a conveyance roller pair -- just before being discharged from 103, conveyance is once stopped. next, the path switch plate 104 is shown in drawing 5 -- it rotates clockwise -- making -- a conveyance roller pair -- inverse rotation of 103 is carried out -- making -- a conveyance roller pair -- Form P is supplied to the conveyance path 105 for double-sided printing by 103, 106, and 107. and a conveyance roller pair -- it becomes printable to the rear face of Form P by 108 by conveying Form P in the pressure-welding section of a roller 63 and the middle imprint object 5. Thus, since double-sided printing is possible, it can contribute to saving of Form P.

[0070] And a process cartridge can be detached [as shown in drawing 6 / frame side cover / since the frame side cover 2 which can be opened and closed freely is formed in the lateral portion of the side which counters the front face of the middle imprint object 5] also in this operation gestalt, and attached easily, without causing interference with the frame mentioned above.

[0071] And in this operation gestalt, LED arrays 72M, 72C, and 72Y and 72Bk are located in down [opposite to the direction of sampling] to being the configuration which samples a process cartridge upward as shown in drawing 6. Therefore, it does not become the obstacle at the time of LED arrays 72M, 72C, and 72Y and 72Bk being the sampling of a process cartridge. Although LED arrays 72M, 72C, and 72Y and 72Bk need to approach photoconductor drums 3M, 3C, and 3Y and 3Bk and it is necessary to arrange them on the property, they do not become the hindrance of exchange by constituting like this operation gestalt. Therefore, since LED arrays 72M, 72C, and 72Y and a location gap of 72Bk do not arise even if it exchanges process cartridges, generating of a color gap can be suppressed certainly.

[0072] Moreover, the cleaning means 73M, 73C, and 73Y of this operation gestalt and 73Bk consist of Containers 74M, 74C, and 74Y, 74Bk, Blades 75M, 75C, and 75Y and 75Bk, and the screws 76M, 76C, and 76Y as a conveyance means and 76Bk, as shown in drawing 7 (A).

[0073] As Screws 76M, 76C, and 76Y and 76Bk are shown in drawing 7 (B), it is extended and formed in photoconductor drums 3M, 3C, and 3Y and the direction of a revolving shaft of 3Bk, and each containers 74M, 74C, and 74Y and 74Bk are connected by the end side of a longitudinal direction with the connection pipe 77. This connection pipe 77 is connected with the waste toner hold container 78 in the lower part location.

[0074] In this way, since this operation gestalt is the configuration of forming the waste toner hold container 78 in the bottom of the body of equipment, it does not become the hindrance of exchange of the waste toner hold container 78 of a process cartridge. Moreover, in this way, the cleaning means 73M, 73C, and 73Y and

73Bk are not included in a process cartridge, and even if it is the case where a cleaner loess method is not adopted further, a waste toner can be processed certainly. Since especially the waste toner hold container 78 is formed in one place of the bottom of the body of equipment, **** of exchange can be reduced compared with the case where it prepares for near [every] the photoconductor drum of each color. Moreover, since this operation gestalt has adopted the tandem system every length, after even the connection pipe 77 conveys a waste toner by Screws 76M, 76C, and 76Y and 76Bk, a waste toner can be dropped with gravity and simplification of a configuration can be attained.

[0075] (3rd operation gestalt) Next, the 3rd operation gestalt of this invention is explained based on drawing 8. In addition, the same sign is given to a common part with the 1st operation gestalt, and explanation is omitted.

[0076] The place where this operation gestalt has arranged the belt-like middle imprint object 5 in the direction of slant a little as shown in drawing 8 differs from the 1st operation gestalt.

[0077] Thus, even when the belt-like middle imprint object 5 has been arranged in the direction of slant a little, the installation area of equipment can be decreased.

[0078] Also in this operation gestalt, since it is prepared in the lateral portion of the side which counters the front face of the middle imprint object 5, a frame side cover 2 can perform exchange of a process cartridge easily, without being barred by the frame. Therefore, generating of a color gap can be suppressed certainly.

[0079] Moreover, in this operation gestalt, the control panel 15 is formed in the best location of a lateral portion in which the frame side cover 2 was formed. Therefore, all of the closing motion direction of the frame side cover 2 in the case of exchange of a process cartridge, the direction of ejection of the discharged form, and the actuation direction of a control panel 15 are the same directions, and a laser beam printer with very sufficient operability can be offered. Moreover, the aforementioned effectiveness can be acquired, even if it establishes an inclined plane in the upper part of the side face of the body of equipment in which the frame side cover 2 was formed and arranges a control panel 15 to the inclined plane. That is, what is necessary is just to form a control panel 15 in the side in which the frame side cover 2 is formed.

[0080] In addition, this invention is applicable to the image formation equipment using other polymerization toners obtained with the image formation equipment which used nonmagnetic 1 component developers other than a suspension-polymerization toner, for example, an emulsion polymerization etc., similarly.

[0081]

[Effect of the Invention] Since it is color picture formation equipment of a mold tandem system every so-called length according to color picture formation equipment according to claim 1 as explained above, the area of an installation side can be decreased. And since the process cartridge was arranged free [attachment and detachment] from the lateral portion of the side which counters the front face of a belt-like middle imprint object, exchange of a process cartridge is easy, and since a proper location can be equipped certainly, the so-called generating of a color gap can be reduced certainly.

[0082] Although it is necessary to support the LED array concerned at the both ends of the shaft orientations in order to have the LED array prepared in the shaft orientations of said electrostatic latent-image support by extending fixed to color picture formation equipment according to color picture formation equipment according to claim 2 As mentioned above, since exchange of said process cartridge is performed from the lateral portion of the side which counters said front face of the middle imprint object of the shape of said belt, the supporter of said LED array does not become obstructive at said *****. Consequently, a location gap of said LED array is prevented certainly, and can reduce the so-called generating of a color gap certainly.

[0083] According to color picture formation equipment according to claim 3, said development means and said electrostatic latent-image support are contained in said process cartridge at least, but Since each of two or more of said LED arrays has countered from the opposite direction to each front face of two or more of said electrostatic latent-image support with the balking direction over said middle imprint object of said process cartridge Even when an LED array with the need of making said electrostatic latent-image support approaching, and arranging is used, the LED array concerned does not become obstructive in the case of balking of said process cartridge. Consequently, while a proper location is certainly equipped with said process cartridge, a location gap of said LED array is prevented certainly, and can reduce the so-called generating of a color gap certainly.

[0084] According to color picture formation equipment according to claim 4, since it is collected said two or more developer support be alike through electrification and exposure, respectively with migration of each electrostatic latent-image support, the transfer residue developer on each electrostatic latent-image support becomes unnecessary [the waste developer container for accumulating said transfer residue developer].

Therefore, at the time of exchange of said process cartridge, a waste developer container does not serve as hindrance, but the so-called generating of a color gap can be reduced certainly.

[0085] According to color picture formation equipment according to claim 5, since it dissociates with electrostatic latent-image ***** at the time of exchange of said process cartridge, said electrification means is performed easily, without exchange of the process cartridge containing the electrostatic latent-image ***** concerned being barred by said electrification means. Therefore, the so-called generating of the color gap at the time of exchange of said process cartridge can be prevented certainly.

[0086] According to color picture formation equipment according to claim 6, the path of insertion of said transfer-medium supply tray, and the eject direction of the transfer medium to said transfer-medium discharge tray Since it is the direction which counters this front face of the middle imprint object of the shape of a belt which is the path of insertion and this direction of said process cartridge, and was established so that a front face might move along the direction of an abbreviation vertical The workability of the ejection of said transfer medium by which said transfer-medium supply tray was detached, attached and discharged can be raised without barring the miniaturization of equipment.

[0087] According to color picture formation equipment according to claim 7, the actuation direction of a control panel can also raise operability further, without barring the miniaturization of equipment in the path-of-insertion list of said process cartridge and said transfer-medium supply tray, since it is the eject direction and this direction of a transfer medium of said transfer-medium discharge tray.

[0088] According to color picture formation equipment according to claim 8, since a cleaning means is not included in said process cartridge, said cleaning means does not become obstructive at the time of exchange of said process cartridge. Therefore, the so-called generating of the color gap which can set at the time of exchange of said process cartridge, and is required is prevented certainly. Moreover, after conveying, as for the collected waste developer, it is possible to make it fall caudad by gravity, and since it is conveyed by the migration shaft orientations of said electrostatic latent-image support with a conveyance means, even when a cleaning means is not included in said process cartridge, processing of a waste developer can perform it exactly.

[Translation done.]

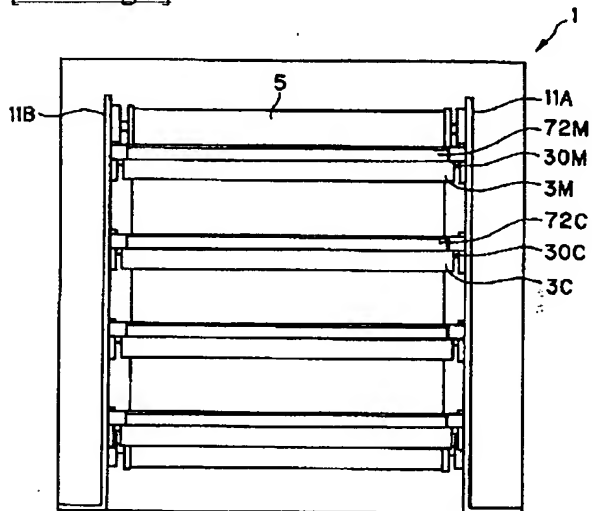
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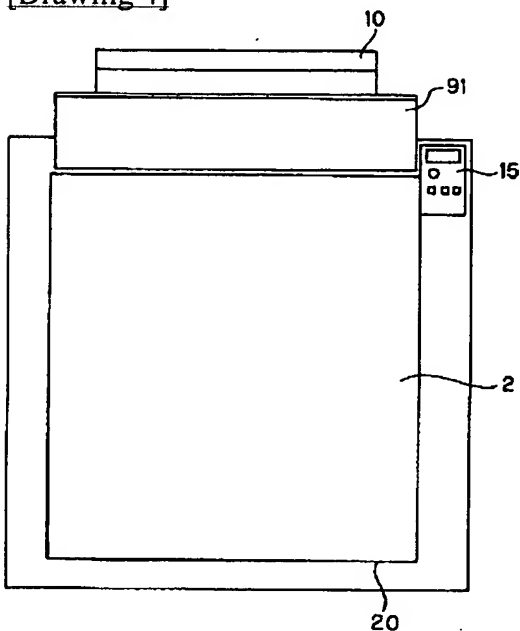
- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
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- 3.In the drawings, any words are not translated.

DRAWINGS

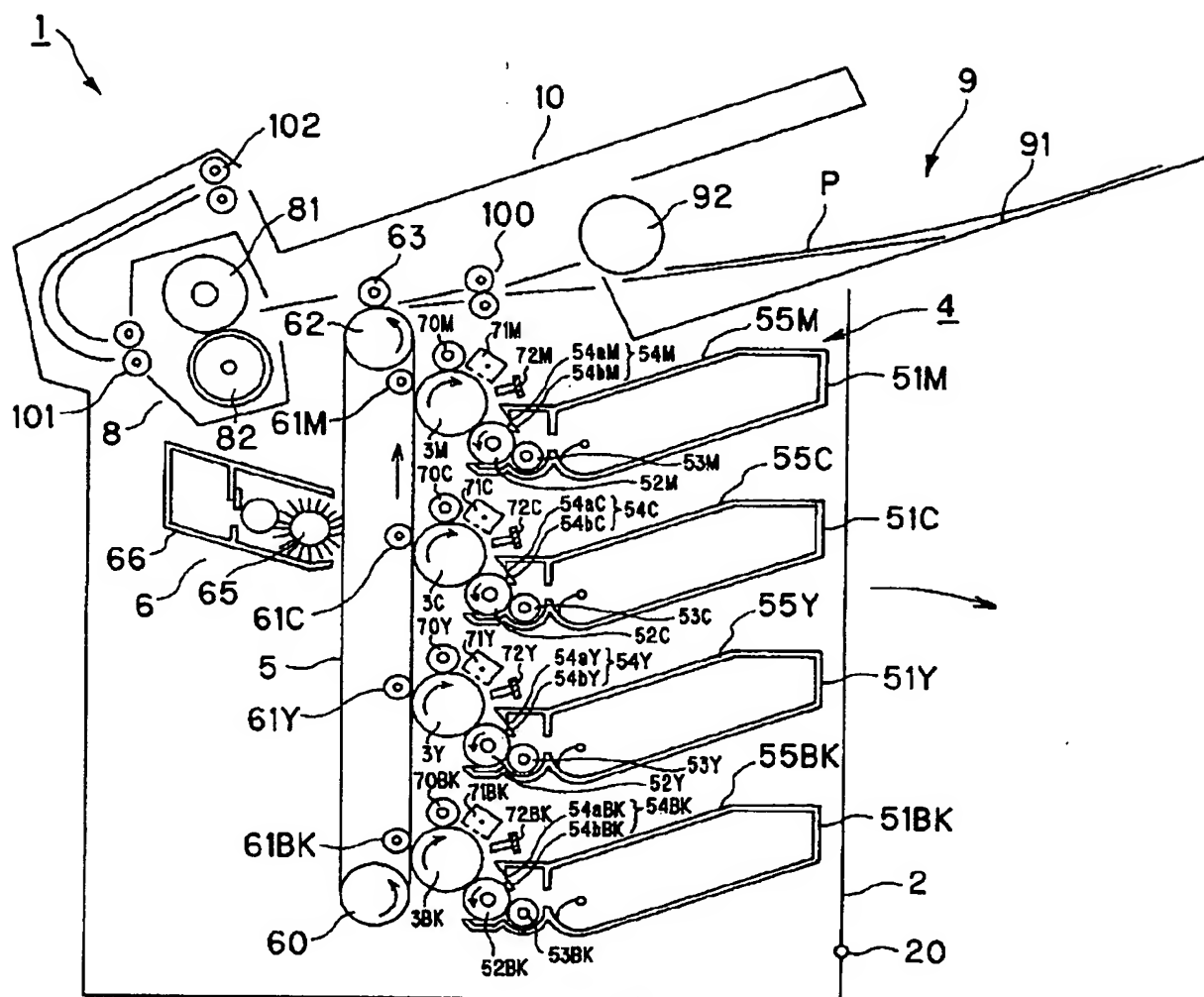
[Drawing 3]



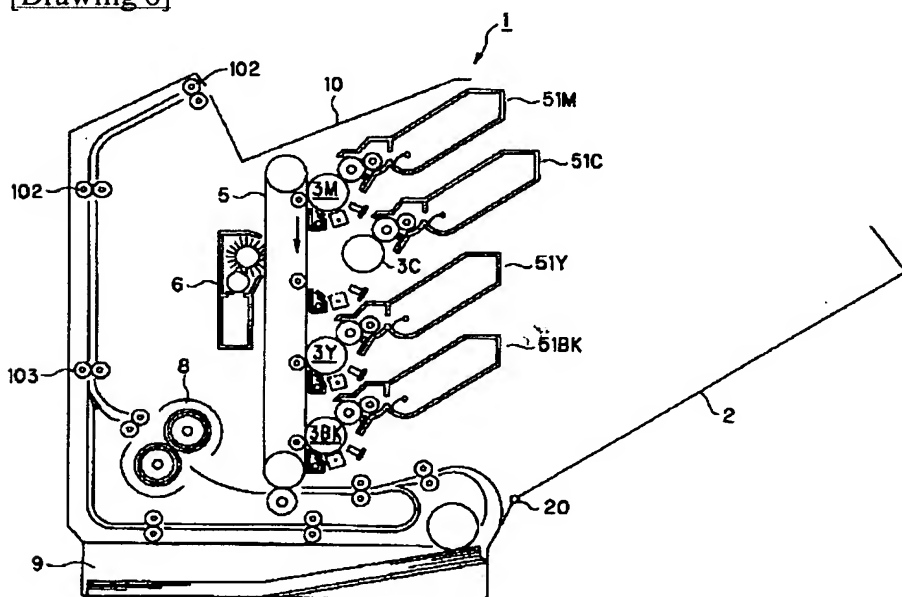
[Drawing 4]



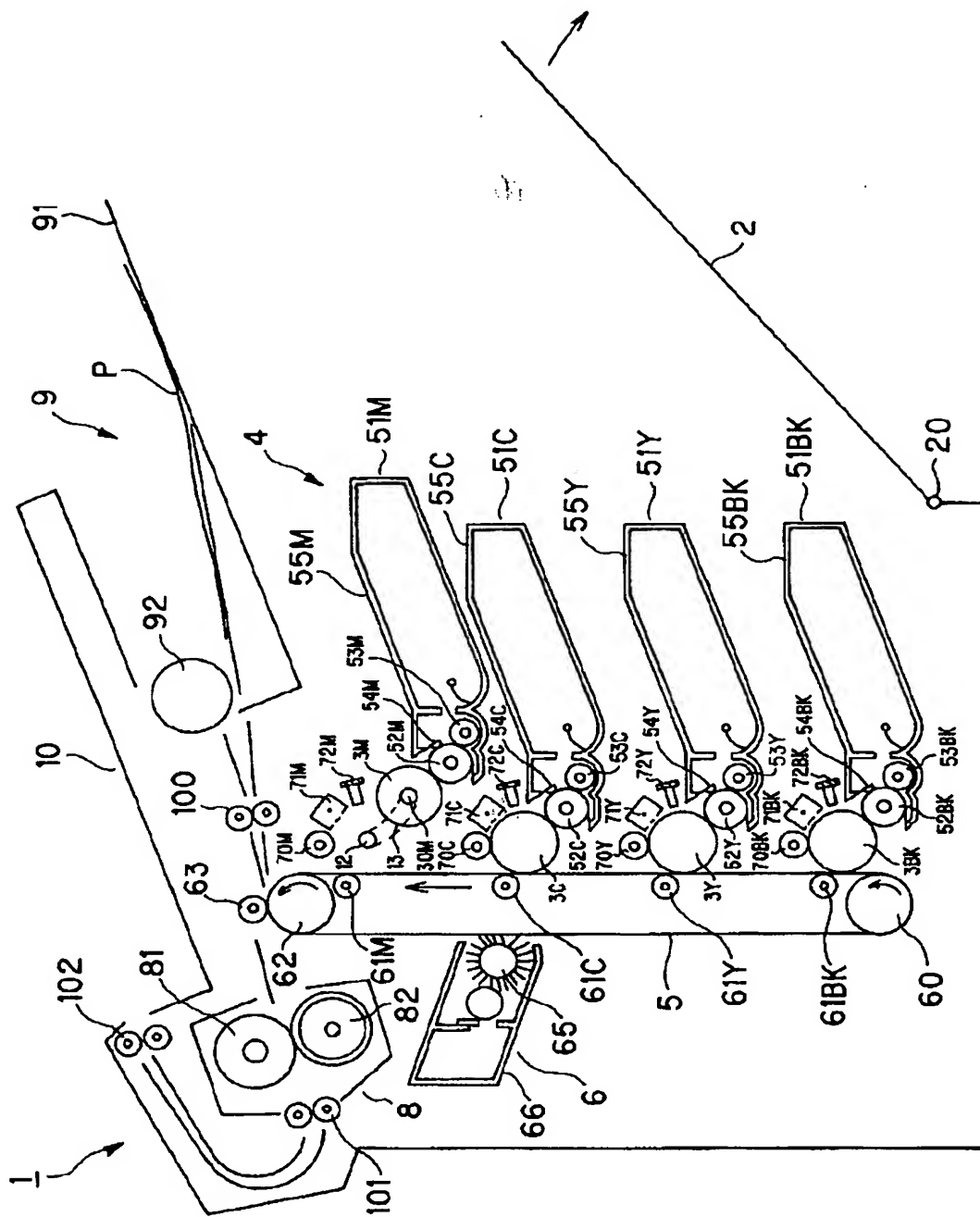
[Drawing 1]



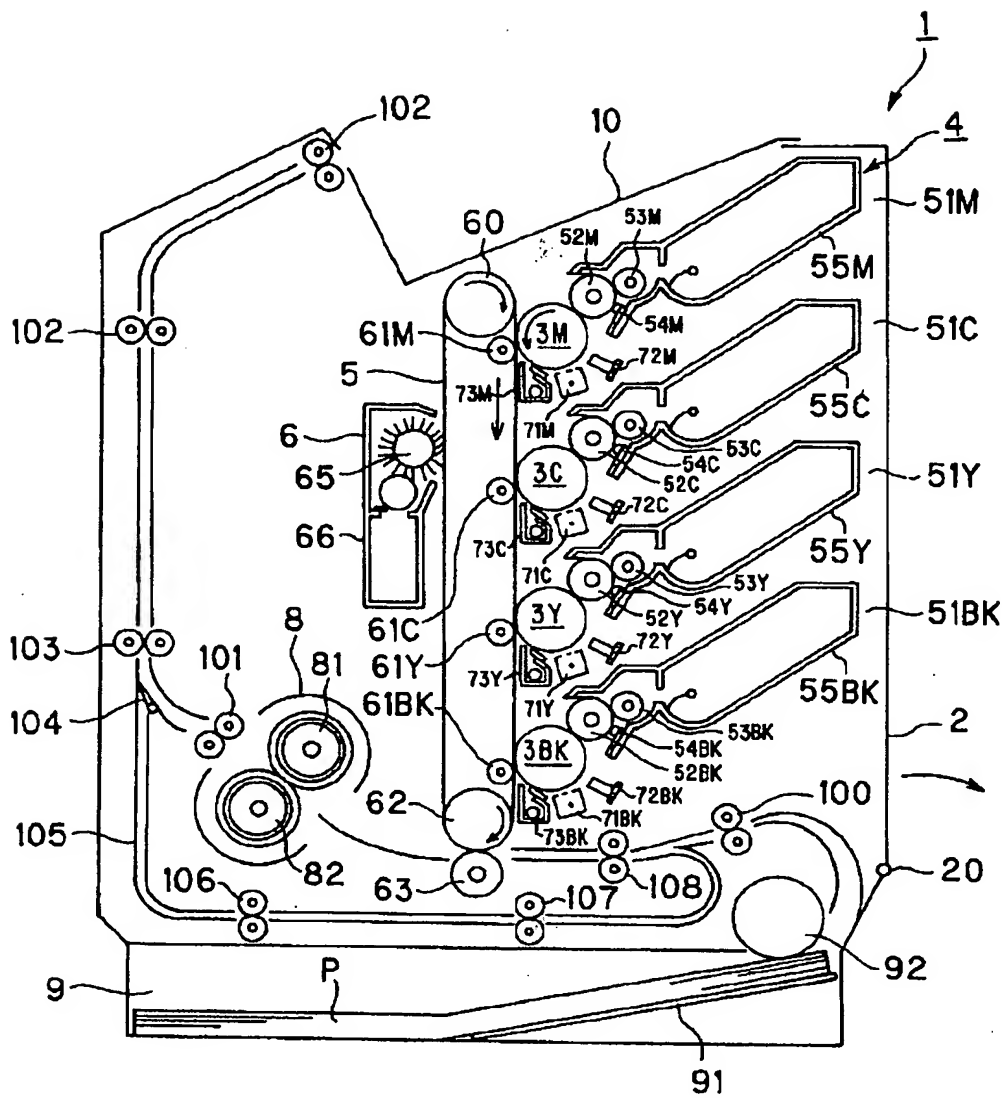
[Drawing 6]



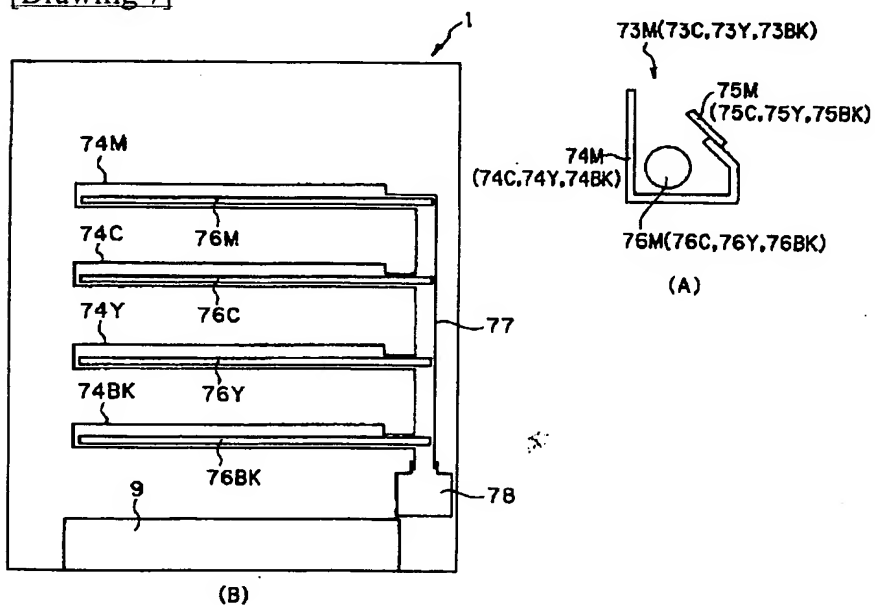
[Drawing 2]



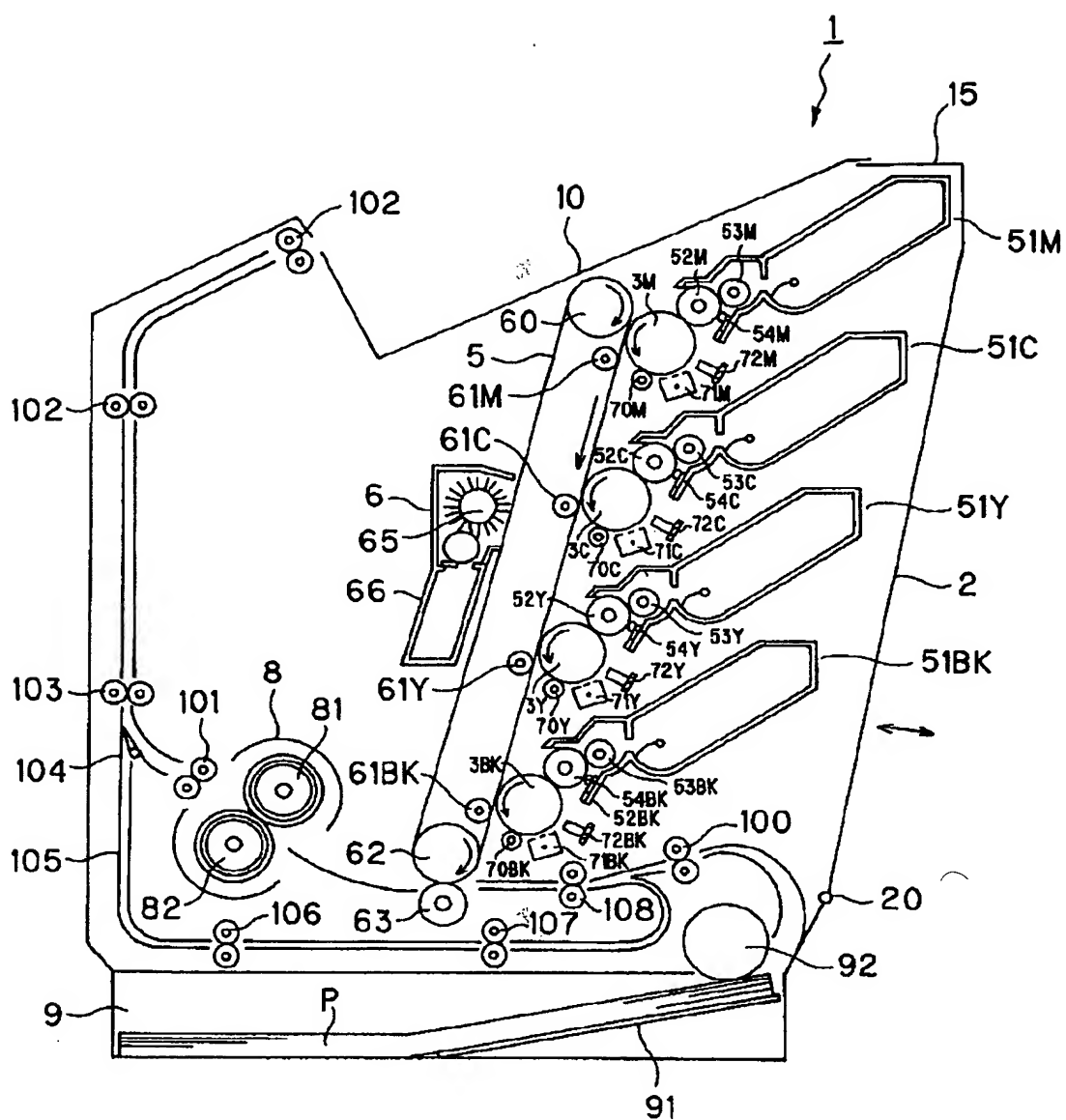
[Drawing 5]



[Drawing 7]



[Drawing 8]



[Translation done.]